PEACE/WILLISTON
FISH & WILDLIFE
COMPENSATION
PROGRAM

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A Reconnaissance Survey Of Emerslund Lake (lower)

A. R. Langston and A. R. McLean
1998

PWFWCP Report No. 137

105-02924/

The Peace/Williston Fish & Wildlife Compensation Program is a cooperative venture of BC Hydro and the provincial fish and wildlife management agencies, supported by funding from BC Hydro. The Program was established to enhance and protect fish and wildlife resources affected by the construction of the W.A.C. Bennett and Peace Canyon dams on the Peace River, and the subsequent creation of the Williston and Dinosaur Reservoirs.

Peace/Williston Fish and Wildlife Compensation Program, 1011 Fourth Ave. 3rd Floor, Prince George B.C. V2L 3H9

Website: *www.bchydro.bc.ca/environment/initiatives/pwcp/*

This report has been approved by the Peace/Williston Fish and Wildlife Compensation Program Fish Technical Committee.

Citation: A. R. Langston and A. R. McLean. 1998. A reconnaissance survey of Emerslund Lake (lower). Peace/Williston Fish and Wildlife Compensation Program, Report No. 137. 26pp plus appendices.

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A RECONNAISSANCE SURVEY OF

EMERSLUND LAKE (LOWER)

WATERSHED:	Peace River
DATE OF SURVEY:	June 19, 20 1993
FIELD CREW LEADER:	A.R. McLean
FIELD ASSISTANT:	G. Hopcraft

PEACE/WILLISTON FISH AND WILDLIFE COMPENSATION PROGRAM

B. C. HYDRO

and

MINISTRY OF ENVIRONMENT, LANDS AND PARKS

REPORT PREPARED BY: A.R. Langston and A.R. McLean

RELEASED BY: _____

Nick Baccante, Regional Fisheries Biologist

HAGANEY
HILLS
Federal Ranch
RIVER
BUTLER
RIDGE
WILLISTON
LAKE
Peace
Reach
HUDSONS HOPE
DISTRICT
MUNICIPALITY
INDIAN
HEAD
CARBON
PEAK
MT.
GETHING
PARSONET
HILL
SCALE 1: 250 000

LAKE: Emerslund (Lower) **SYSTEM NAME:** Emerslund Creek

A.S.A.P. REFERENCE NO.: **SYSTEM NO:** 230-8605-352

DATA ON FILE FOR THIS SURVEY

Location	x	Dissolved 02/Temp. Profiles	x
Physical Data	x	Winter Dissolved 02/Temp. Profiles	--
Bench Mark	x	Netting Record	x
Terrain Features	x	Lake Catch Summary	x
Access	x	Individual Fish Data	x
Resorts and Campsites	x	Fish Preserved	--
Other Developments	x	Stomach Analysis	x
Obstructions and Pollutions	x	Scale Reading	x
Special Restrictions	x	Location of Inventory Sites	x
Aquatic Plants	x	Photograph Directory	x
Wildlife Observations	x	Appendices:	
Miscellaneous Comments	x	A: Water Chemistry Analysis	x
Lake Drainage	x	B: Tributary Stream Data	x
Fisheries Management Comments	x	Bathymetric Map Reduction	x
History of Previous Surveys	x	Bathymetric Map	x
Water Chemistry Summary	x		

LOCATION

Location: - approximately 85 km northwest of Hudson's Hope.
- approximately 140 km west of Ft. St. John.

Elevation: 928 m +/-
Latitude/Longitude: 56°23'05":123°04'25" U.T.M.: 10.4954.62486
Management Unit: 7-36 N.T.S. Map No: 94 B/6 (edition 2)

Drainage: Emerslund C. --> Nabesche R. --> Williston Reservoir (Peace Reach) --> Peace R.

PHYSICAL DATA

Lake Drainage Area:	--	km^2	Volume:	725000	m^3
Water Surface Area:	150000	m^2	Flushing Rate:	--	
Area above 6 m contour:	90000	m^2	Perimeter of Islands:	n/a	
Shoreline Perimeter:	3100	m	Number of Islands:	0	
Maximum Depth:	14.7	m	Mean Depth:	4.8	m
Filterable Residue (TDS):	231	mg/l	Secchi Reading:	2.6	m
Sounding Device:	Lowrance X-1 5		Elevation Source: contour interpolation		

BENCHMARK

(Iron spike, centre of red circle) located on the west side of the lake, approximately 2.4 m from waters edge, in 28 cm diameter spruce tree. Benchmark is set 2.0 m above current lake level.

High water mark: 0.2 m above water level at time of survey.

TERRAIN FEATURES

Immediate Shoreline:

The slope to waters edge is low to moderate with the exception of the steeply sloped southeast and northwest ends. Lower Emerslund Lake is treed to lakes edge with alder and spruce. A fringe of sedge grass fronts most of the shoreline. Sedge grass marshes are located on the southwest and northeast shores. Shoreline substrate is primarily organics, with gravel, cobble and boulder sparsely intermixed. Lake bottom drops off gradually with the exception of the moderate to steeply sloped southeast and northwest ends. Recreational access to the lake is best suited to low sloping north and southwest ends.

Surrounding Country:

Lower Emerslund Lake is located in the Rocky Mountain Foothills. Mountainous peaks are visible in all directions except north. The forest cover is primarily coniferous with deciduous species sparsely intermixed. A burn (1991 "EM-Fire") is visible in all directions except south. Lower Emerslund Lake is situated in the boreal white and black spruce biogeoclimatic zone.

ACCESS

Directions:

From Ft. St. John, at the junction of 100th Avenue and Alaska Highway, proceed north approximately 82 km on the Alaska Highway and turn left onto the Upper Halfway gravel road. Proceed along the gravel road crossing the Halfway River at 56 km. Take left fork just after crossing river, right fork at 66.5 km, keep right at 82.9 km and keep right at 101.5 km. Proceed to the Graham River. Turn right and follow river upstream on private road approximately 600 m to Ottertail Guide Outfitters, located in Crying Girl Prairie. The Emerslund Lakes are approximately a 15 minute helicopter flight west from Crying Girl Prairie.

Alternately, a single lane, seasonal road in poor condition exists between Crying Girl Prairie and the Emerslund Lakes. Access by four wheel drive vehicles, ATVs, horses and snowmobiles is possible.

Road Type and Conditions:

The Alaska Highway is a paved all weather highway. The Halfway River Road is a two lane all weather gravel road in good condition. The Ottertail Guide Outfitters private road is a single lane, dirt/gravel road in fair condition.

Restrictions:

At the time of survey, only vehicles of the logging company Canadian Forest Products were allowed to travel on the seasonal road from Crying Girl Prairie to the Emerslund Lakes.

RESORTS AND CAMPSITES

None.

OTHER DEVELOPMENTS

A small cabin (Ottertail Guide Outfitters) with road access, and an old airstrip are located on the right bank of the outlet approximately 150 m downstream from the lake.

OBSTRUCTIONS AND POLLUTIONS

None.

SPECIAL RESTRICTIONS

None noted.

AQUATIC PLANTS

Potamogeton sp. was noted in moderate concentrations.

WILDLIFE OBSERVATIONS

5	moose	2	loons
1	osprey	1	eagle
1	beaver	1	gull
1	king fisher		

MISCELLANEOUS COMMENTS

An abundance of aquatic insects were observed (not identified).
The Emerslund Lakes are collectively referred to as the "Two Lakes" by area residents.

Bathymetric map: The lake outline is from an enlargement of aerial photograph BC4200 No. 57. The photograph was taken in September of 1963.

LAKE DRAINAGE

General:

Lower Emerslund Lake has 8 inlets (7 intermittent) and 1 outlet. Emerslund Creek is the main tributary (inlet) of Lower Emerslund Lake. The creek is approximately 0.6 km in length and flows southwest from Upper Emerslund Lake to Lower Emerslund Lake. The outlet, Emerslund Creek, flows approximately 13 km south to its confluence with the Nabesche River.

Major Systems:

None.

Minor Systems:

Unnamed Creek - Inlet #1

This creek enters the lake along the northeast shore. The initial 250 m of inlet #1 was investigated. Approximately 230 m upstream of the lake, the wetted width was 8.3 m, average depth 0.5 m and gradient 1.2%. The inlet afforded adequate spawning habitat, however a 20% fines content was noted. Good rearing habitat was noted throughout the inlet (undercut banks, L.O.D., overhanging vegetation, instream vegetation).

See point sample card for additional information.

Unnamed Creek - Intermittent Inlet #2

This inlet had an average wetted width of 0.5 m, average depth of 0.05 m, approximately 10 m upstream from the lake. The creek flows over a rutted road (ruts greater than 0.5 m in depth) approximately 15 m upstream from the lake. This creek has an organic substrate, affording no fisheries potential.

Unnamed Creeks - Intermittent Inlets #3, 4, 7, 8

These inlets had an average wetted width range of 0.1 m to 0.3 m and an average depth range of 0.02 m to 0.08 m. The inlets afford no fisheries potential.

Unnamed Creeks - Intermittent Inlets #5, 6

Inlets #4 and 5 had an average wetted width of 0.5 m, average depth of 0.1 m and a water temperature of 7°C. These meandering inlets, with organics substrate, afford no fisheries potential.

Emerslund Creek - Outlet

The initial 420 m of this creek, which flows from the southwest end of the lake, was investigated. The first 200 m of the outlet had an average wetted width of 20 m, average depth of 1.5 m and no spawning substrate (organic substrate, low gradient). Adequate rearing habitat was noted (overhanging vegetation, instream vegetation). At approximately 420 m downstream from the lake, the creek had an average wetted width of 8.3 m, average depth of 0.35 m, gradient of 1.3% and a water temperature of 9.5°C. Moderate spawning and rearing (L.O.D., overhanging vegetation, undercut banks) habitat was noted (15% fines).

See point sample for additional information.

FISHERIES MANAGEMENT COMMENTS

Lower Emerslund Lake supports a population of bull trout, lake and mountain whitefish, and two non sport fish species. Four net sets (average set time 1.25 hours) yielded 8 bull trout (length range 26.5-46.0 cm), 47 mountain whitefish, 32 lake whitefish and 6 longnose suckers. In addition, 13 lake chub were captured in 1 minnow trap. The gill nets were set for short periods so as to minimize the impact on bull trout, allowing for live release once sampled. Inlet #1 and the outlet provide adequate spawning habitat and good rearing habitat.

No barriers to fish movement between Upper and Lower Emerslund Lakes were observed. Fish movement between the two lakes is likely. No barriers to fish movement were noted on the first kilometre of Emerslund Creek downstream of Lower Emerslund Lake. Fish passage between Nabesche River and the Emerslund Lakes may be possible, but was not confirmed.

Lower Emerslund Lake appears to provide an adequate sport fishery for both bull trout and whitefish. The local guide outfitter, based in Crying Girl Prairie, indicated that low angling pressure was being exerted on the Emerslund Lakes in the summer and winter.

HISTORY OF PREVIOUS SURVEYS

Lake Surveys:

None known.

Other Related Surveys:

None known.

WATER CHEMISTRY SUMMARY **Limnology Station No. 1**

Field Conditions:

Date:	June 20, 1993		
Time:	1400 hrs	Air Temperature:	15.0 °C
Wind Velocity:	moderate	Wind Direction:	west
Cloud Cover:	6/10o.c.	Surface Condition:	light ripple
Secchi Disc:	2.6 m	Water Colour:	slightly tannic

Method(s) Used:

Dissolved Oxygen:	YSI model 58 oxygen/temperature meter
Water Temperature:	YSI model 58 oxygen/temperature meter
Air Temperature:	Hand-held alcohol thermometer
pH (field):	Digital pH pocket tester
H2S (field):	Hach H2S field test kit
Laboratory Used:	Zenon Environmental Inc. B.C. Laboratory Services
Water Sampler:	Vertical Alpha Water Bottle (Vandorn)
Substrate Sampler:	Substrate sample not taken

Water Sample Chemistry: SEAM Site No.: Not determined

	Sampling Depths			
	Surface (0 m)		Lower (12.0 m)	
pH (field)	9.2		8.7	
pH (lab)	8.5		8.1	
Specific Conductance (lab)	387	umhos/cm	428	umhos/cm
Filterable Residue 105°C (lab)	231	mg/l	246	mg/l
H2S (field)	---	mg/l	0	mg/l

Bottom Depth: 13.7 m

Substrate Sample Depth: -- m

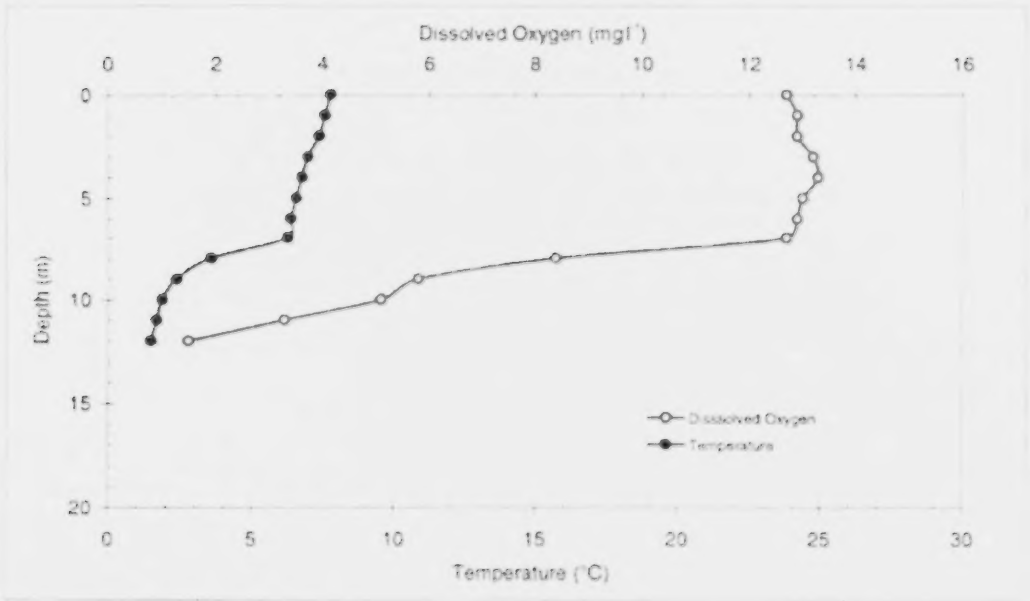
DATE: June 20, 1993

SUMMER OXYGEN/TEMPERATURE DATA

DEPTH (m)	02 (mg/1)	TEMP (°C)
Surface	12.7	7.8
1.0	12.9	7.6
2.0	12.9	7.4
3.0	13.2	7.0
4.0	13.3	6.8
5.0	13.0	6.6
6.0	12.9	6.4
7.0	12.7	6.3
8.0	8.4	3.6
9.0	5.8	2.4
10.0	5.1	1.9
11.0	3.3	1.7
12.0	1.5	1.5
13.7	bottom	

SUMMER

Dissolved Oxygen and Temperature Profiles



NETTING RECORD

Mesh sizes experimental order: 25, 76, 51, 89, 38, 64 mm

NETTING SITE #1

Type:	Sinking monofilament		
Date Set:	June 19, 1993	Time:	1440 hrs
Date Lifted:	June 19, 1993	Time:	1630 hrs
Net Dimensions:	Length: 91.4 m	Depth:	2.4 m
Shallow End Mesh Size:	25 mm	Depth:	1.0 m
		Substrate:	organics
Deep End Mesh Size:	64 mm	Depth:	15 m
		Substrate:	?

NETTING SITE #2

Type:	Sinking monofilament		
Date Set:	June 19, 1993	Time:	1750 hrs
Date Lifted:	June 19, 1993	Time:	1855 hrs
Net Dimensions:	Length: 91.4 m	Depth:	2.4 m
Shallow End Mesh Size:	25 mm	Depth:	1.0 m
		Substrate:	organics
Deep End Mesh Size:	64 mm	Depth:	15 m
		Substrate:	?

NETTING RECORD

Mesh sizes experimental order: 25, 76, 51, 89, 38, 64 mm

NETTING SITE #3

Type: Sinking monofilament

Date Set:	June 20, 1993	Time: 0825 hrs
Date Lifted:	June 20, 1993	Time: 1000 hrs
Net Dimensions:	Length: 91.4 m	Depth: 2.4 m
Shallow End Mesh Size:	25 mm	Depth: 1.0 m
		Substrate: organics
Deep End Mesh Size:	64 mm	Depth: 1 1 m
		Substrate: ?

NETTING SITE #4

Type: Sinking monofilament

Date Set:	June 20, 1993	Time: 1030 hrs
Date Lifted:	June 20, 1993	Time: 1 140 hrs
Net Dimensions:	Length: 91.4 m	Depth: 2.4 m
Shallow End Mesh Size:	25 mm	Depth: 1.0 m
		Substrate: organics
Deep End Mesh Size:	64 mm	Depth: 1 1 m
		Substrate: ?

LAKE CATCH SUMMARY

SPECIES	NET SITE NO.				ANGLED	OTHER	TOTAL	NUMBER SAMPLED	NUMBER PRESERVED	SIZE RANGE (cm)
	1	2	3	4						
bull trout	2	4	1	1	0	0	8	8	0	26.5-46.0
mountain whitefish	12	10	15	10	0	0	47	28	0	11.4-34.5
lake whitefish	7	5	5	15	0	0	32	15	0	21.5-42.5
longnose sucker	3	1	0	2	0	0	6	0	0	32.5-42.5

Minnow Traps:

BAIT: Sardines

#	HOURS	DEPTH (m)	SUBSTRATE	SPECIES	SIZE RANGE (cm)
1	18.5	1.2	organics	13 lake chub 1 leach 10 Gammarus	8 cm (Avg.)
2	18.5	1.1	?	--	--

Comments:

Minnow trap #2 was not recovered. Trap was removed by an animal as it was not placed in a location of deep water or fast current.

Lake: **Lower Emerslund**

INDIVIDUAL FISH DATA

Date Captured: June 19/20, 1993

Method of Capture: Sinking monofilament gillnet

M - Male, F - Female, ? - Not Obvious
IMM - Immature, MG - Maturing, MT - Mature, GV - Gravid, SP - Spent, ? - Not Obvious
EG - Egg, FR - Fin Ray, HD - Head, ML - Milt, OT - Otolith
SC - Scale, ST - Stomach, TG - Fish Tag, WF - Whole Fish

SPECIES	Fork Length (cm)	Weight (grams)	Sex	Gonadal Maturity	Sample Type	Age (yr)	Plankton	Stomach Contents			COMMENTS
								Insects	Fish	Other	
bull trout	26.5	170			SC	3 +					regenerated scales
bull trout	28.5	198	M	IMM	OT	4 +		aquatic insects			
bull trout	27.0	150									
bull trout	28.0	227									
bull trout	33.5	212	F	IMM	OT	8 +				tapeworms	
bull trout	34.0	340	M	IMM	OT	7 +				tapeworms	
bull trout	40.5	539	F	MG	FR					tapeworms	
bull trout	46.0	850			FR						
mountain whitefish	11.4	50			SC	2 +					
mountain whitefish	11.4				SC	2 +					
mountain whitefish	12.2				SC	2 +					
mountain whitefish	12.4				SC	2 +					
mountain whitefish	12.6				SC	2 +					
mountain whitefish	24.0	142									
mountain whitefish	24.3	142	F	MG	SC	5 +					stomach empty
mountain whitefish	26.0	227			SC	7 +					
mountain whitefish	26.5	255									
mountain whitefish	30.5	284									
mountain whitefish	30.5	312			SC	6 +					
mountain whitefish	30.9	284			SC	6 +					
mountain whitefish	31.2	284			SC	6 +					
mountain whitefish	31.5	340			SC	6 +				clams	
mountain whitefish	31.6	312			SC	6 +					
mountain whitefish	32.0	396			SC	6 +				clams	

SPECIES	Fork Length (cm)	Weight (grams)	Sex	Gonadal Maturity	Sample Type	Age (yr)	Plankton	Stomach Contents			COMMENTS
								Insects	Fish	Other	
mountain whitefish	32.0	397	M	MG	SC	6+					
mountain whitefish	32.5	340	F	MT	SC	6+				clams	
mountain whitefish	33.0	369			SC	7+					
mountain whitefish	33.5	483			SC	7+					
mountain whitefish	34.5	270									
mountain whitefish	34.5	454			SC	8+					
lake whitefish	21.5	113			SC	4+					
lake whitefish	23.5	369			SC	?					scales regenerated
lake whitefish	25.6	227			SC	3+					
lake whitefish	28.5	225			SC						
lake whitefish	31.2	284			SC	5+					
lake whitefish	31.6	369			SC	6+					
lake whitefish	32.0	397			SC	7+					
lake whitefish	32.5	369	F	MG	SC	5+		aquatic insect larvae		unidentified ooze	
lake whitefish	32.6	369			SC	6+					
lake whitefish	33.5	340			SC	7+					
lake whitefish	33.5	483									
lake whitefish	34.0	397									
lake whitefish	35.5	395									
lake whitefish	38.5	652	M	MT	SC	8+					
lake whitefish	42.5	550			SC	8+					

LOCATION OF INVENTORY SITES
Figure: 1
Lake: Lower Emerslund
Reference No.: B.C. 4200: 057
Reference Date: September, 1963
Scale: 1: 4000
LS 1
NS 1,2
NS 3,4
Plate number, area, and direction
Point sample, number, and location
Bench mark
LS 1 Limno station location and number
NS 1 Netting site location and number
Stream flow direction and number

PHOTOGRAPH DIRECTORY

Negative #	Plate #	Description
R1:21 A	1	Aerial view of Lower Emerslund Lake looking southeast. Note Upper Emerslund Lake (top left corner).
R3:3,4	2	Panoramic view looking northeast, taken from middle of the lake.
R2:19	3	View upstream at point sample site #1 on inlet #1, taken approximately 230 m upstream from the lake.
R2:18	4	View downstream at point sample site #1 on inlet #1, taken approximately 230 m upstream from the lake.
R2:21	5	View of substrate at point sample site #1 on inlet #1, taken approximately 230 m upstream from the lake.
R2:9	6	View upstream at road crossing over intermittent inlet #2, taken approximately 20 m upstream from the lake. Arrows indicate location of inlet.
R2:3	7	View upstream at point sample site #1 on outlet, taken approximately 420 m downstream from the lake.
R2:4	8	View downstream at point sample site #1 on outlet, taken approximately 420 m downstream from the lake.
R3:17	9	Bull trout (33 cm/225 g) netted in Upper Emerslund Lake.
R3:16	10	Lake whitefish (upper) and mountain whitefish (lower) netted in Upper Emerslund Lake.

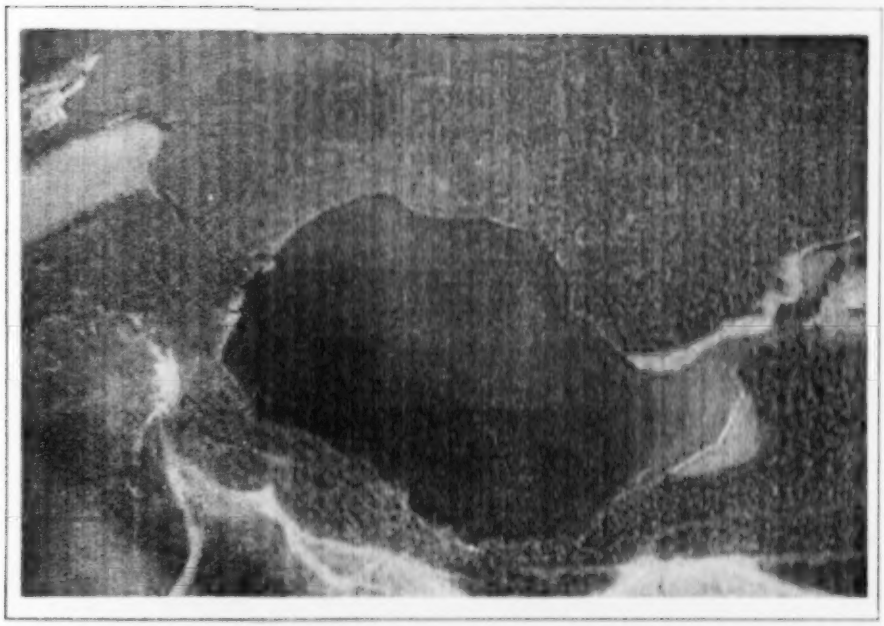


Plate 1: Aerial view of Emerslund Lake (lower) looking southeast.
Note Emerslund Lake (upper) at top left of picture.

Plate 2: Panoramic view looking northeast, taken from middle of lake.

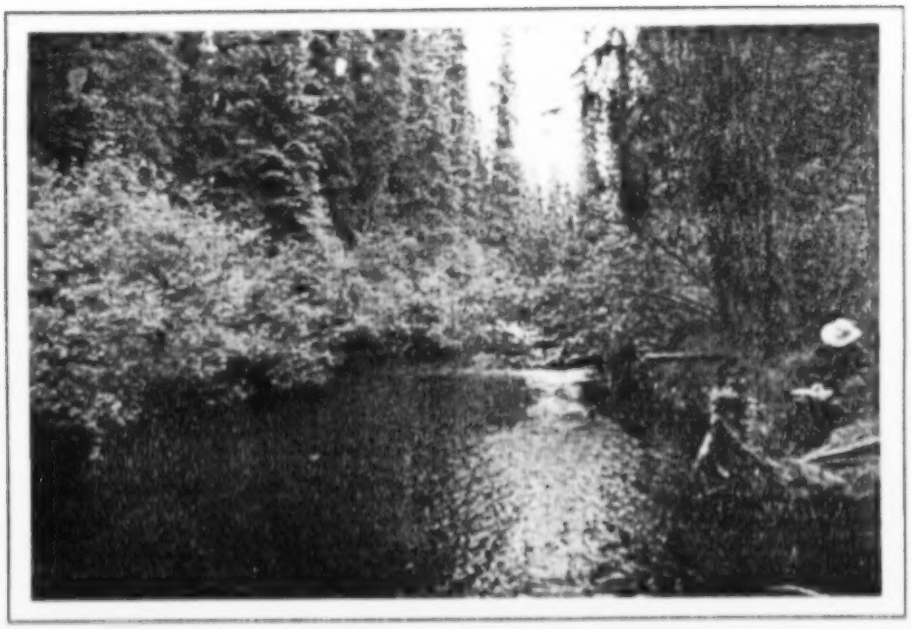


Plate 3: View upstream at point sample site #1 on inlet #1, taken approximately 230m upstream from lake.

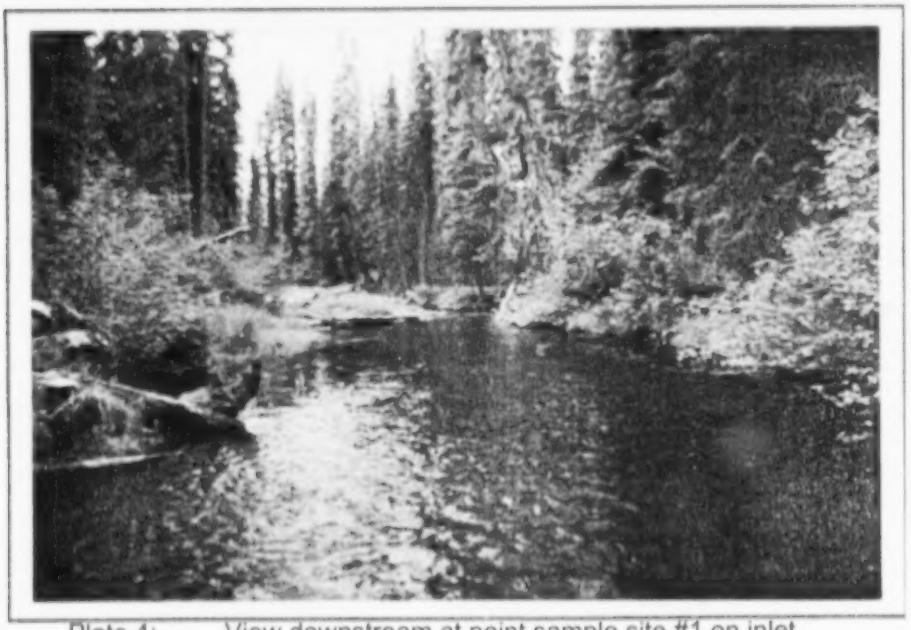


Plate 4: View downstream at point sample site #1 on inlet #1, taken approximately 230m upstream from lake.

Plate 5: View of substrate at point sample site #1 on inlet #1, taken approximately 230m upstream from lake.

Plate 6: View upstream at road crossing over intermittent inlet #2, taken approximately 20m upstream from lake. Arrows indicate location of inlet

Plate 7: View upstream at point sample site #1 on outlet, taken approximately 420m downstream from lake.

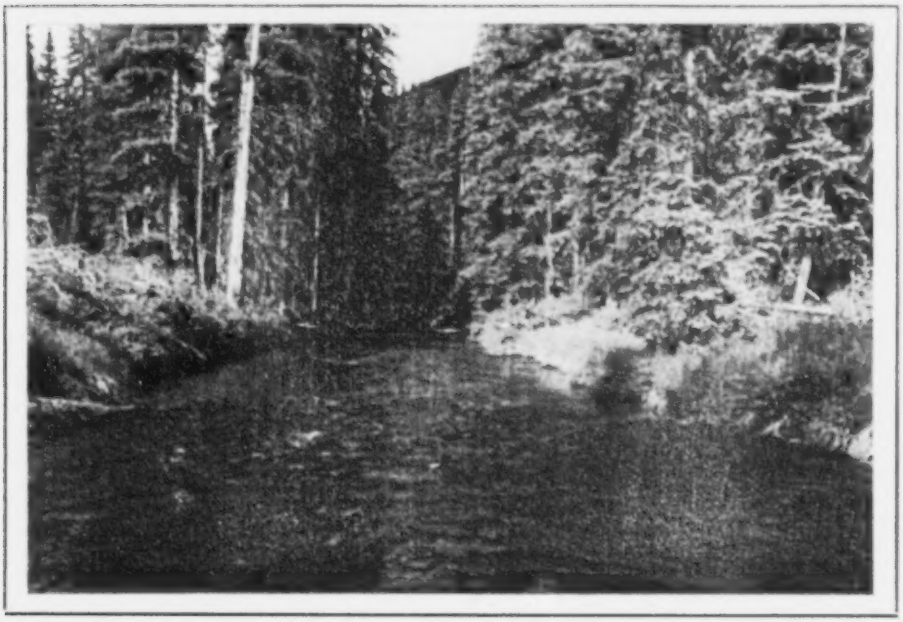


Plate 8: View downstream at point sample site #1 on outlet, taken approximately 420m downstream from lake.

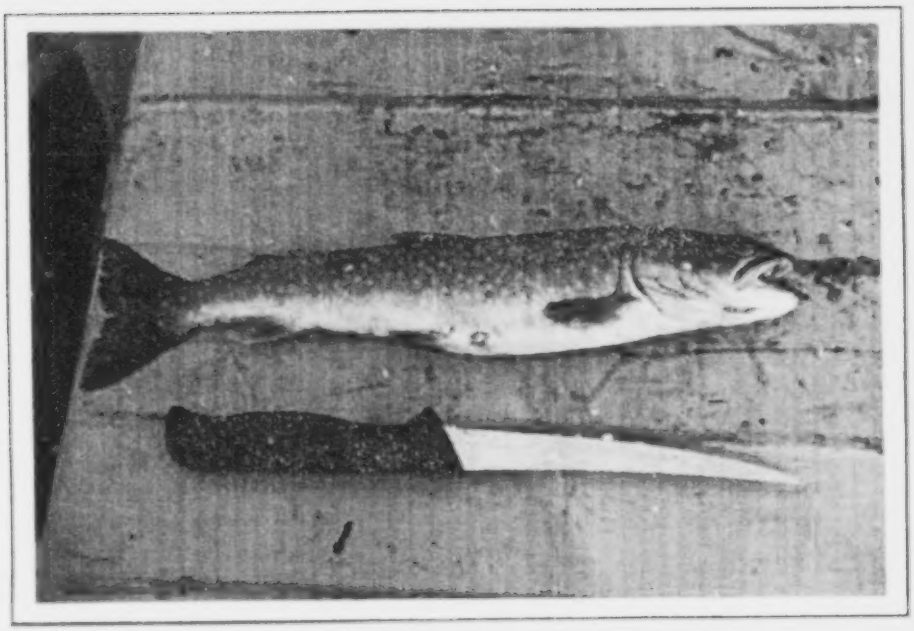


Plate 9: Bull trout (33cm/225g) netted in Upper Emerslund Lake.

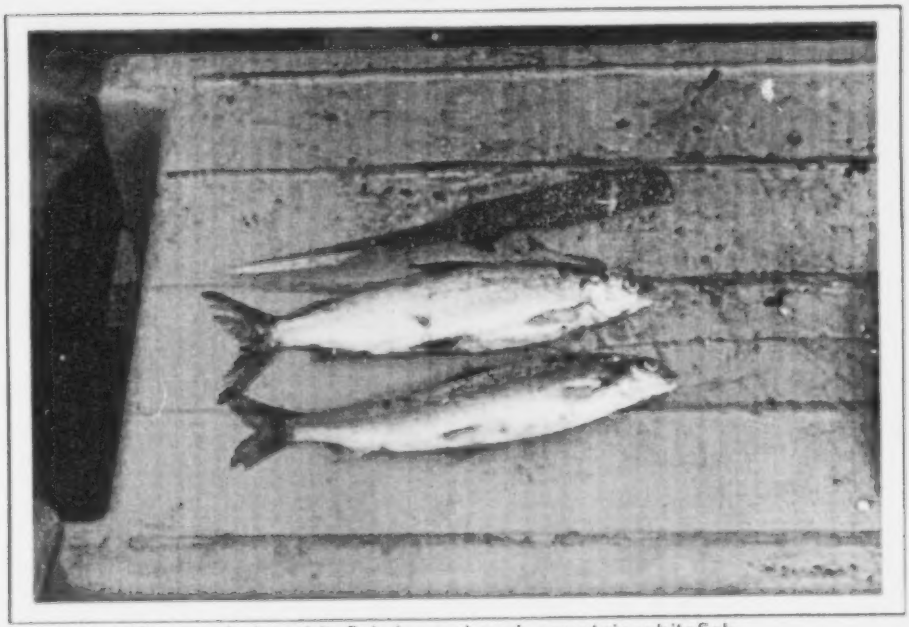


Plate 10: Lake whitefish (upper) and mountain whitefish (lower) netted in Upper Emerslund Lake.

Appendix A

LABORATORY REPORT

Water Chemistry Analysis

ZENON ENVIRONMENTAL LABORATORIES
Certificate of Analysis

Reported To

FISH - PRINCE GEORGE Client Code BD

Waste Management Branch
Northern Region
3rd Floor, 1011 4th Avenue
Prince George, BC V2L 3H9

Submitted By : ARNE LANGSTON
FAX : FISH AND WILDLIFE

Requisition Forms

	Zenon ID
Form 10016184 received on 23-JUN-1993 completed on 15-JUL-1993 containing sample(s)	93012803 93012804

From sampling site NOSITE LOWER EMERSLUND LK

Remarks

- All results are blank corrected except for Hi-Res MS data.
- 'MDC' = Minimum Detectable Concentration
- '<' = Less than MDC
- '---' = Not analyzed
- Solids results are based on dry weight except Volatile Organics, TPH and Biota Analyses.
- Organic analyses are not corrected for surrogate recoveries except for Isotope Dilution methods.

Methods used by Zenon are based upon those found in 'Standard Methods for the Examination of Water and Wastewater', 17th Edition, published by the American Public Health Association, 1015 Fifteenth Street, NW, Washington, DC 20005, or on US EPA protocols found in the 'Test Methods For Evaluating Solid Waste, Physical/Chemical Method, SW846', 3rd Edition. Other procedures are based on methodologies accepted by the B.C. Ministry of Environment.

ANALYTICAL REPORT
Form 10016184

Sampling site : NOSITE LOWER EMERSLUND LK
Submitted by : ARNE LANGSTON

Zenon ID : 93012803

Sparcode	Parameter		Unit	MDC	Media	Workroute
00041220	pH	8.5	pH units	1.0	02/01	Automated PH Meter
00111160	Specific Conductance	387	uS/cm	1	02/01	Cond.Meter Siebold
00081071	Residue Nonfilt.	< 4	mg/L	4	02/01	Grav; Subsamp Buch 105C
007H1033	Res. Filterable 1.Ou	231	mg/L	4	02/01	Grav 1.0 um Filter
01021210	Alkalinity Total 4.5	187	mg/L	0.5	02/01	Automated Electrometer

Sample State : Fresh Water
Sampled on : 93/06/20 00:01

ANALYTICAL REPORT
Form 10016184

Sampling site : NOSITE LOWER EMERSLUND LK
Submitted by : ARNE LANGSTON

Zenon ID : 93012804

Sparcode	Parameter		Unit	MDC	Media	Workroute
00041220	pH	8.1	pH units	1.0	02/01	Automated pH Meter
00111160	Specific Conductance	428	uS/cm	1	O2/O1	Cond. Meter Siebold
00081071	Residue Nonfilt.	< 4	mg/L	4	02/01	Grav; Subsamp Buch 105C
007H 1033	Res. Filterable 1.Ou	246	mg/L	4	02/01	Grav 1.0 um Filter
01021210	Alkalinity Total 4.5	208	mg/L	0.5	02/01	Automated Electrometer

Sample State : Fresh Water
Sampled on : 93/06/20 00:02
Upper Depth : 12.0
Lower Depth : 12.0

DETAILED BILLING
Form 10016184

Sparcode or PKG	Parameter	Secop	Operation	WKU	Price (Regular)	# of te	Total-per-it WKU	Cost
00041220	pH	4401	pH Meter	3	$3.86	YY....2	6	$7.71
00111160	Specific Conductanc	4404	Cond.Meter Siebold	5	$6.43	YY....2	10	$12.85
00081071	Residue Nonfilt.	4424	Grav. Buch. 9cm 105C	14	$17.99	YY....2	28	$35.98
007H1033	Res. Filterable 1.0	4429	Filt 1.0u Grav 105C	14	$17.99	YY....2	28	$35.98
01021210	Alkalinity Total 4.5	4402	Auto.Pot.Tit.St.Acid	11	$14.13	YY....2	22	$28.27
					Total for form 100		94	$120.79

Client code BD : FISH - PRINCE GEORGE
Client type : Ministry contract.
Sampling Site : NOSITE LOWER EMERSLUND LK
Submitted by : ARNE LANGSTON

This form, entered on 23-JUN-1993 12:42 has been completed on 15-JUL-1993 00:13
The following records have been entered in the charging file

93-07-15 3R1 BD $120.79 Form 10016184 94 44 - For General Serv

Appendix B

TRIBUTARY STREAM DATA

System Name: **Emerslund Creek** **Inlet #1**

System No.: **230-8605-352**

Site Location: Sample Site #1, located approximately 230 m upstream from the lake.

Date:	June 20, 1993	Time:	1349 hrs
Channel Width:	9 m	Water Temp.:	8 °C
Wetted Width:	8.3 m	Stage (flow)	high
Max. Depth:	85 cm	Velocity:	0.83 m/sec
Avg. Depth:	50 cm	Field Gradient:	1.2%
Turbidity:	85 cm	Colour:	gin clear

Flood Signs:

Height: 60 cm

Type: organic debris

Substrate Breakdown:

Fines	Small Gravel	Large Gravel	Cobble
20%	10%	25 %	45%
Boulder	**Bedrock**		
0 %	0%		

Substrate Compaction: low Sand: -%

Banks:

	Form	Height	Stability
Right	straight	0.5 m	stable due to rooted vegetation
Left	straight	0.55 m	stable due to rooted vegetation

Comments:

Adequate spawning habitat, however 20% fines content.
Good rearing habitat (undercut banks, L.O.D., overstream vegetation, instream vegetation).
Velocity and field gradient measured over 10 m.

System Name: Emerslund Creek **Outlet**

System No.: **230-8605-352**

Site Location: Sample Site #1, located approximately 420 m downstream from the lake.

Date:	June 20, 1993	Time:	0930 hrs
Channel Width:	8.3 m	Water Temp.:	9.5 °C
Wetted Width:	8.3 m	Stage (flow)	high
Max. Depth:	38 cm	Velocity:	0.71 m/sec
Avg. Depth:	35 cm	Field Gradient:	1.3%
Turbidity:	38 cm	Colour:	gin clear

Flood Signs:

Height: -- cm

Type: --

Substrate Breakdown:

Fines	Small Gravel	Large Gravel	Cobble
15%	10%	25%	45%
Boulder	Bedrock		
5 %	0%		

Substrate Compaction: low Sand: 1%

Banks:

	Form	Height	Stability
Right	straight	0.38 m	stable due to rooted vegetation
Left	straight	0.68 m	stable due to rooted vegetation

Comments:

Velocity and field gradient measured over 10 m.
Moderate spawning habitat noted (15% fines content). Moss covers a low percentage of substrate in the outlet.
Moderate rearing habitat noted (L.O.D., overhanging vegetation, undercut banks)

Reduced to
33%
of Original
FISHERIES BRANCH
CONSERVATION SECTION
STATISTICS AT TIME OF SURVEY
EMERSLUND LAKE
(LOWER)
1:1800
SHEET 1